

### **DETAILED ACTION**

Applicant's response filed June 20, 2011 is acknowledged. Applicant's affidavit filed June 20, 2011 is acknowledged. Claims 1-14, 20-31, and 53 are pending and further considered on the merits.

#### ***Response to Amendment***

In light of the response, the examiner maintains the grounds of rejection set forth in the office action dated March 21, 2011.

#### ***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 1-3, 5-6, 8-14, 20 and 53** are rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya et al., JP 09-187646 (Motoya) in view of Omori et al., US 6689465 (Omori).  
3. Regarding claim 1, Motoya discloses an adsorbent article for filtration of impurities (¶ 0004) comprising an organic polymer resin and an inorganic ion absorbing material, said inorganic ion absorbing material being supported on the outer surface of said adsorbent article (¶ 0005).  
4. Motoya fails to explicitly disclose that the article is porous and has inorganic ion absorbing materials formed within the cavities of a porous article. However, Omori discloses a porous bead comprising an organic polymer resin having gaps between fibrils forming a communicating pore, at least a part of said fibrils having a cavity in the interior of each fibril (abstract, fig. 13, and col. 4, l. 52-57).

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5. At the time of invention, it would have been obvious to modify the adsorbent article of Motoya to include the porous bead of Omori since it has been shown that such porous beads are useful for filtration of large quantities of hot water and for adsorption of impurities contained in the hot water (Omori, col. 3, l. 20-24). Furthermore, it would have been obvious to one skilled in the art to include the inorganic ion absorbents of Motoya within the pores of said bead in order to increase the adsorbing efficiency of said bead.

6. Regarding claim 2, Omori further discloses that said porous bead has pores having a maximum pore diameter in a layer in the vicinity of the surface of said bead (col. 22, l. 5-8).

7. Regarding claim 3, Omori further discloses that said porous bead has an average particle diameter of 100 to 2,500  $\mu\text{m}$  (abstract).

8. Regarding claims 5-6 and 8, Motoya in view of Omori disclose the inorganic ion absorbing material comprises a hydrated oxide of titanium (¶ 0007) and has a particle diameter of 0.01 to 100  $\mu\text{m}$  (¶ 0008).

9. Regarding claim 9, Motoya in view of Omori discloses an article wherein the inorganic ion absorbing material is an amount of 30 to 95% is supported thereon (¶ 0010).

10. Regarding claims 10-12, Motoya in view of Omori discloses an article wherein the fibril comprises the organic polymer resin, inorganic ion absorbing material and water soluble polymer, said water soluble polymer being polyvinylpyrrolidone (¶ 0009-0010).

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11. Regarding claim 13, while Motoya in view of Omori fail to disclose a porous article wherein the water soluble polymer is in an amount of 0.001 to 10%, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have the claimed range of water soluble polymer contained therein, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (MPEP 2144.05, Section II, Part A).

12. Regarding claims 14, 20, and 53, Omori further discloses that said porous beads can be packed into a column (col. 11, l. 46-52).

13. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya in view of Omori as relied upon in claim 1, and in further view of Chang et al., US 5418284 (Chang).

14. Motoya in view of Omori fail to disclose an article comprises polyacrylonitrile. However, Chang discloses polyacrylonitrile beads (abstract) useful for chromatographic separations (col. 1, l. 49-51).

15. At the time of invention, it would have been obvious to one skilled in the art to modify the porous formed article of Motoya in view of Omori to include the composition of Chang in order to use a well known material for an ion exchange column adsorbent.

16. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya in view of Omori as relied upon in claim 1, and in further view of CHEREMISNIOFF, Handbook of Water and Wastewater Treatment Technology.

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17. Motoya in view of Omori fail to explicitly disclose that the inorganic material includes activated carbon impregnated with aluminum sulfate. However, Cheremisinoff discloses that activated carbon impregnated with aluminum sulfate is a commonly known coagulant for water treatment (pg. 136). Therefore, it would have been obvious to a person having ordinary skill in the art to include a well known coagulant for water treatment in the porous article used for water treatment of Motoya in view of Omori.

18. **Claims 21-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya in view of Omori as relied upon in claim 1, and in further view of Kazuhiko, JP 2003-305458 (Kazuhiko).

19. Regarding claims 21-24, Motoya in view of Omori discloses the ion absorbent for removing ions from waste water as shown in the rejections above but fails to explicitly disclose the treatment apparatus. However, Kazuhiko discloses a pH controlling device (fig. 3-5, REF 21) and membrane separation device (¶ 0023 and REF 22/23) are installed in a stage before the column (REF 2); and the ion adsorbing device includes water sending means for supply a desorption liquid to the column (REF 3 and P).

20. At the time of invention, it would have been obvious to one skilled in the art to modify the ion adsorbent of Motoya in view of Omori to include the treatment apparatus of Kazuhiko since it naturally flows that a routineer in the art would have motivation to include waste water treatment apparatus with an ion absorbent for use in waste water treatment.

21. Regarding claims 25-26, Kazuhiko further discloses a crystallization tank (REF 11), adding means for adding a crystallizing agent (REF 14), a crystallizer provided with

stirring means (¶ 0022), and a membrane separation device (¶ 0023 and REF 22/23) for separating precipitates.

22. Regarding claims 27-28, Kazuhiko discloses liquid supplying means (REF 15/3, ¶ 0024, 0044, 0046, 0048, 0050, and Table 1) for supplying an alkaline liquid and for supplying a pH adjusting liquid which is obtained by separating a liquid from a solid after a crystallization reaction (REF 11, 18) to a column (REF 2).

23. Regarding claim 29, Kazuhiko discloses a pH adjusting tank (REF 18), a pH meter (controller), a chemical liquid injection pump working with the pH controller, pH adjusting liquid supplying means, and a line (REF 3) for passing water in the pH adjusting tank to the column (¶ 0044, 0046, 0048), where it is implicit that the pH adjuster line present in tank (REF 18) includes a pump and pH adjusting liquid supplying means shown in part 10 of the apparatus (¶ 0040).

24. Regarding claim 30, Kazuhiko further discloses liquid supplying means for supplying wash water to the column (¶ 0014).

25. Regarding claim 31, Kazuhiko discloses a pH adjusting means (REF 9) for adjusting pH of treatment water flowing out from the column.

***Response to Arguments***

26. Applicant's arguments with respect to claim 1 have been considered but are not persuasive.

27. Applicant states that Omori does not utilize the same method of producing a porous bead stated in applicant's specification, therefore the bead of Omori does not comprise inter-fibril cavities or pores. In response, the examiner considers the

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polymeric bead of Omori to inherently comprise fibrils having inter-fibril cavities or pores. Furthermore, it is noted that the features upon which applicant relies (i.e., method steps for producing the adsorbent article) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

28. Applicant provides figures in the affidavit filed June 20, 2011 which purportedly show that the structure of the bead disclosed in Omori does not comprise fibrils having cavities within said fibrils. However, taking the broadest reasonable interpretation of the claim, the examiner is interpreting a fibril to be an elongated section formed from the organic polymer resin, and a cavity to be an indentation or hole formed within the fibril. As can be seen in the affidavit, figure B (Omori) shows a plurality of fibrils forming pores, wherein the fibrils further comprise indentations within the fibril. Applicant shows that the structure of the claimed porous article is indeed different than that shown in the prior art. However, the examiner reminds applicant that the language used in the current claims can be interpreted such that it encompasses both the structure disclosed by the applicant and the structure disclosed in the prior art.

#### ***Conclusion***

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to a whose telephone number is (571)270-7370. The examiner can normally be reached on Mon - Fri (9am-4pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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